



## Title

# EX-SITU BIOREMEDIATION PROCESS OF HYDROCARBON POLLUTED SOILS USING *PSEUDOMONAS* AND *BACILLUS* MICROORGANISMS



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## Short presentation

Soil polluted with petroleum hydrocarbons (with an initial concentration of  $4280 \text{ mg kg}^{-1}$ ), after sorting and homogenization is mixed with nutritive substances (C/N/P 100:10:1) and microorganisms and placed in a pile (Lxlxh:3000x1400x500 mm). The pile of soil is placed on an impermeable surface consisting of a concrete platform over which plastic foil was added. At the bottom of the pile is placed a drainage layer made of gravel (4-7 mm diameter), inside which is introduced the pipe system through which aeration and wetting is carried out. The system for introducing water and the solution with nutrients and microorganisms  $151 \times 10^5 \dots 213 \times 10^7 \text{ CFU/g}$  of soil (*Pseudomonas* and *Bacillus*) consists of a tank with a capacity of 100 L, a hydrophoric pump with a flow of 50 L/min, corrugated hoses and a blower. The discharge hose is connected to the distribution network that consists of an  $\varnothing 180 \text{ mm}$  PVC pipe branched into five perforated  $\varnothing 50 \text{ mm}$  PVC pipes, placed horizontally in the middle of the pile. Research carried out at pilot scale level for 12 weeks at the following parameters: 28-30% moisture, temperature of 24-26 °C, pH of 7.5-8, 5 days a week and 8 h a day aeration, with a flow of  $50 \text{ m}^3/\text{min}$ , have shown a decrease in the concentration of pollutant below  $1000 \text{ mg kg}^{-1}$ . Results obtained on the pilot scale model have shown a high depollution yield: 83%.



## Applicability

Decontamination of soils polluted with hidrocarbons – there have been developed an innovative solution for ex-situ bioremediation of contaminated soils with hidrocarbons. This process can also be adapted to treat polluted soil with other pollutants such as heavy metals. Soil treatment based on this patent can be used for the ecological rehabilitation of hidrocarbons polluted sites: areas with oil exploitation, areas related to fuel stations, accidental pollution. It is a process of reducing the impact on the environment, it has low costs and it is suitable for treating large quantities of soil.



## Image

